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Citation for published version:

Kastner, I 2017, 'Reflexive verbs in Hebrew: Deep unaccusativity meets lexical semantics', *Glossa*, vol. 2, no. 1, 75. <https://doi.org/10.5334/gjgl.299>

Digital Object Identifier (DOI):

[10.5334/gjgl.299](https://doi.org/10.5334/gjgl.299)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Glossa

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RESEARCH

Reflexive verbs in Hebrew: Deep unaccusativity meets lexical semantics

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Reflexive verbs in Modern Hebrew show specific morphological marking: only one of the seven verbal templates in the language can be used for reflexives. Yet this morphological marking also appears on anticausative verbs, which have different syntactic and semantic properties. I provide an analysis of reflexivity in Hebrew which does not make reference to dedicated reflexive morphosyntax. By combining independently needed functional heads, the proposal explains what in the syntax underlies this morphology and how different kinds of verbs end up with identical morphophonological properties. To this end, I consider the lexical semantics of individual lexical roots as well as the syntactic configurations in which roots and arguments are embedded. The resulting theory is one in which lexical roots trigger specific interpretations of the syntax at the interfaces.

Keywords: Hebrew; lexical semantics; morphology; syntax; reflexivity; unaccusativity

1 Introduction

1.1 Background

Reflexive verbs have posed a long-standing puzzle for theories of argument structure: one argument appears to have two thematic roles, agent and patient. If *John kicked*, John could not have kicked himself, but if *John shaved*, it is clear that he shaved himself. The reflexive reading for *shave* arises even without a reflexive anaphor. While some languages, like English, do not differentiate morphologically between verbs like *shave* and verbs like *kick*, many languages do express reflexivity through morphological means. The degree to which this state of affairs is problematic varies from theory to theory, but reflexive verbs are predominantly marked morphologically, suggesting that the morphosyntax might be marked as well.

Within contemporary generative work two questions regarding reflexive verbs have risen to the fore. The first is whether there exist dedicated reflexivizers, operators whose sole job is to reduce the arity of a predicate, or whether this job is carried out through a conspiracy of other components of the grammar. Both options carry implications for where the origin of morphological marking lies and what it tracks. If dedicated reflexivizers are part of the morphological toolkit of any grammar, we might expect to find them in many languages. In contrast, if reflexive marking arises through a combination of other means, we would need to identify what these are on a language-by-language basis.

The second question is whether reflexive verbs are unaccusative or unergative: where is the argument generated and how does it come to be the subject of the clause. This question is tied to the environments that are licensed by a reflexive verb, as we will see below.

In general, the answers to both of these questions may well vary by language. On the question of dedicated reflexivizers, Reinhart & Siloni (2005) and Labelle (2008) answer

in the affirmative for Hebrew and French, while Lidz (2001) answers in the negative for Kannada. Analyses of reflexive constructions without reflexivizers have been put forward in other languages as well, including Greek (Spathas et al. 2015) and Latin (Miller 2010). The verbal morphology of Modern Hebrew can shed further light on these debates since argument structure alternations are reflected in the templatic morphology of the language.

The current paper presents a novel analysis of reflexives in Hebrew, one that does not make use of a reflexivizer as such and that treats reflexives as unaccusative. Any analysis of Hebrew requires an understanding of how the non-concatenative morphological system is derived. The current account of reflexive verbs is couched in a general theory of the Semitic verb, employing contemporary theories of morphology in order to analyze a peculiarity of Hebrew: reflexive verbs are only possible in one of the verbal templates, specifically the most complex one morphophonologically.

The paper is organized as follows. I first provide a brief introduction to the verbal morphology of Hebrew. Section 2 then surveys and analyzes anticausative verbs in the template in question, *hitXaYeZ*, and Section 3 does the same for reflexive verbs. Section 4 extends the discussion to the role of deep unaccusativity, surface unaccusativity and lexical semantics in the study of argument structure. Alternative analyses are considered next in Sections 5 (for different theoretical approaches) and 6 (for different approaches to Hebrew), before Section 7 concludes.

1.2 Hebrew morphology in a nutshell

Verbs in Modern Hebrew are instantiated in one of seven distinct morphophonological templates. Not all will be discussed here: our focus is mainly on the one notated *hitXaYeZ*, with other templates brought up as necessary. Each template is traditionally associated with a certain kind of argument structure alternation: causative, passive, and so on (Berman 1978; Doron 2003; Arad 2005; Borer 2013; Kastner 2016). For example, one typical alternation is between transitive verbs in *XaYaZ* and their anticausative (detransitivized) variants in *niXYaZ*. On the notation used here, X, Y and Z are placeholders for the consonants which make up the root, \sqrt{XYZ} ; examples are given in IPA. The anticausative alternation for *XaYaZ* ~ *niXYaZ* is shown in (1). Hebrew does not generally employ a zero-derived labile alternation as with English *open* (transitive) ~ *open* (intransitive).¹

- (1) a. josi **patax** et ha-jaar.
 Yossi opened.SMPL ACC the-gate
 ‘Yossi opened the gate.’
 b. ha-jaar { **niftax** / ***patax** }.
 the-gate opened.MID opened.SMPL
 ‘The gate opened.’

Simple as this alternation may be, it does not generalize to all roots. First, there exist anticausative verbs in *niXYaZ*, (2), with no causative alternation in *XaYaZ* from which they could have been derived. While causative variants exist in other templates, it is debatable whether a strict derivational relationship should be postulated as in e.g. Laks (2013). Second, there exist verbs in *niXYaZ* which are not anticausative, (3): they can be shown to pattern with unergative verbs, rather than unaccusative ones (Kastner 2016). In addition, not all roots instantiate verbs in all seven templates, indicating a high degree of lexical idiosyncrasy: for each root, information must be listed indicating which template it can appear in.

¹ Though see Borer (1991), Doron (2003: 61), Lev (2015) and Kastner (2016: Chapter 2.3.2) on *heXYiZ*.

- | (2) | Root | <i>XaYaZ</i> | <i>niXYaZ</i> | |
|-----|---------------------|--------------|---------------|---------------|
| a. | $\sqrt{\text{rdm}}$ | — | nirdam | ‘fell asleep’ |
| b. | $\sqrt{\text{ʕlm}}$ | — | ne’elam | ‘disappeared’ |
| c. | $\sqrt{\text{rg’}}$ | — | nirga | ‘calmed down’ |
- (3) gilad **nixnas** be-gaava la-bajt ha-xadaʃ.
 Gilad entered.MID in-pride to.the-house the-new
 ‘Gilad entered his new house proudly.’

Of interest in the current paper is the “complex” template *hitXaYeZ*, exemplified in (4)–(6). The typical alternation for this template is an anticausative one, between a transitive verb in *XiYeZ* and an anticausative in *hitXaYeZ* (the notation *Y* indicates lack of spirantization, a phonological process I return to in Section 3). We will focus on the fact that verbs in *hitXaYeZ* can have other readings associated with them, (5)–(6), besides an anticausative correspondent of *XiYeZ*.

- (4) *Anticausative*
- a. josi **bifel** marak.
 Yossi cooked.INTNS soup
 ‘Yossi cooked some soup.’
- b. ha-marak **hitbafel** ba-femeʃ.
 the-soup got.cooked.INTNS.MID in.the-sun
 ‘The soup cooked in the sun.’
- (5) *Reflexive*
- a. jitsxak **iper** et tomi.
 Yitzhak made.up.INTNS ACC Tommy
 ‘Yitzhak applied make-up to Tommy.’
- b. tomi **hitaper**.
 Tommy made.up.INTNS.MID
 ‘Tommy put on make-up’ (*‘Tommy got make-up applied to him’)
- (6) *Reciprocal*
- a. josi **xibek** et ʒager.
 Yossi hugged.INTNS ACC Jagger
 ‘Yossi hugged Jagger.’
- b. josi ve-ʒager **hitxabk-u**.
 Yossi and-Jagger hugged.INTNS.MID-3PL
 ‘Yossi and Jagger hugged.’

The puzzle posed by *hitXaYeZ* is the following: why is it that reflexive verbs appear only in this template and not in any of the others? This question is inherently tied to two related questions: why is this template morphophonologically complex, and what is the range of verbs that may be instantiated in it. To answer these questions, I will propose that reflexives and anticausatives share an unaccusative structure, but that the lexical semantics of the root constrains the derivation. Specifically, reflexive verbs are argued to be the result of unaccusative syntax with an agentive modifier and self-oriented lexical semantics. These notions will be made explicit in Sections 2.3 and 3.2. The thrust of the argument is that reflexive readings fall out naturally once certain elements are combined in the syntax, elements which are independently attested in the grammar.

2 Anticausatives

I begin with anticausatives. The general approach is laid out in Section 2.1. Section 2.2 introduces Hebrew anticausatives and diagnoses them as unaccusative. Section 2.3 presents a formal analysis.

2.1 The building blocks of argument structure

The discussion in this paper highlights how roots place requirements on the syntactic derivation. In English, for instance, it has been suggested in different ways that there is a difference between the semantics of $\sqrt{\text{DESTROY}}$, $\sqrt{\text{GROW}}$ and $\sqrt{\text{BREAK}}$ which goes beyond pure meaning. This difference leads to an inability to take complements in nominalized form (Chomsky 1970; Marantz 1997).

- (7) $\sqrt{\text{DESTROY}}$: change of state, externally caused
 - a. The enemy's destruction of the city.
 - b. The city's destruction (by the enemy).
- (8) $\sqrt{\text{GROW}}$: change of state, internally caused
 - a. *John's growth of tomatoes.
 - b. The tomatoes' growth (*by John).
- (9) $\sqrt{\text{BREAK}}$: result
 - a. *John's break of the glass.
 - b. *The glass' break.

Similar observations have been made more recently for a variety of phenomena in different languages (Haspelmath 1993; Levin & Rappaport Hovav 1995; Schäfer 2008). The details are less important right now than the intuition that something about the lexical semantics of the root constrains what should otherwise be an identical syntactic derivation. In these cases, the underlying assumption is that the morphosyntax of the verbs *destroy*, *grow* and *break* is identical in that they are all made up of a root and a verbalizer, with no extra syntactic material determining their argument structure.

Nevertheless, argument structure alternations can be conditioned by additional syntactic material. For instance, markers such as German *sich* and Romance SE famously reduce the total arity of the verb, descriptively speaking (e.g. Labelle 2008; Schäfer 2008; Cuervo 2014). In order to account for the Hebrew facts, I will take the connection highlighted in the previous section—that between argument structure and the template—and cash it out in terms of the syntactic head Voice.

Throughout the paper I assume that morphological structure is built up in the syntax (Halle & Marantz 1993), with late insertion of phonological material proceeding from the most deeply embedded element outwards (Bobaljik 2000; Embick 2010). The external argument is introduced by the functional head Voice (Kratzer 1996; Pylkkänen 2008). Acategorial roots modify one of the “categorizing” heads *v*, *n* and *a* (Marantz 1997; Arad 2003; Harley 2014). To see how roots affect argument structure, we begin with anticausatives.

2.2 Anticausatives in Hebrew

The traditional view of Semitic templates is that they encode argument structure alternations, as in (1) and (4) above. The examples in (10a–c) list a number of similar alternations for *XaYaZ* and *niXYaZ*. A similar pattern holds for many roots in *XiYeZ* and *hitXaYeZ*, as in (10d–f).

(10) Examples of anticausatives

Templates	Root	Causative		Anticausative	
a.	$\sqrt{\text{fbr}}$	ɣavar	‘broke’	niɣbar	‘got broken’
b. $XaYaZ \sim niXYaZ$	$\sqrt{\text{kra}}$	kara	‘tore’	nikra	‘got torn’
c.	$\sqrt{\text{mtx}}$	matax	‘stretched’	nimtax	‘got stretched’
d.	$\sqrt{\text{prk}}$	pirek	‘dismantled’	hitparek	‘fell apart’
e. $XiYeZ \sim hitXaYeZ$	$\sqrt{\text{ptst}}$	potsets	‘detonated’	hitpotsets	‘exploded’
f.	$\sqrt{\text{bjl}}$	bijel	‘cooked’	hitbajel	‘got cooked’

In all these cases, the non-active version is a detransitivized form of the active version and shares the same root as the active verb. The derived verbs in (10) are all intransitive and their bases transitive.

2.2.1 Agent-oriented adverbs

A number of agent-oriented tests show that no agents are possible with anticausatives in Hebrew. The phrase *me-atmo* ‘by itself’ diagnoses the lack of an external argument (Levin & Rappaport Hovav 1995; Alexiadou & Anagnostopoulou 2004; Alexiadou & Doron 2012), be it explicit (as with transitive verbs) or implicit (as with passives). The test is appropriate with anticausatives in the *niXYaZ* template shown above, (11a), but not with direct objects of transitive verbs, (11b), or with passive verbs, (11c–d).

- (11) a. ha-kise **niɣbar** **me-atmo**.
 the-chair broke.MID from-itself
 ‘The chair fell apart (of its own accord).’
- b. *miri **ɣavra** et ha-kise **me-atmo**.
 Miri broke.SMPL ACC the-chair from-itself
 (int. ‘Miri broke the chair of its own accord’)
- c. *ha-kisa **porak** **me-atmo**.
 the-chair dismantled.INTNS.Pass from-itself
 (int. ‘The chair was dismantled of its own accord’)
- d. *ha-sveder **nisrag** **me-atmo**.
 the-sweater knitted.MID from-itself
 (int. ‘The sweater was knitted of its own accord’)

Anticausatives in *hitXaYeZ* are no different. The unprefixed base forms in *XiYeZ* is active, (12a), but the derived verb is compatible with ‘by itself’, (12b).

- (12) a. ha-tsoref **pirek** et ha-tsamid.
 the-jeweler dismantled.INTNS ACC the-bracelet
 ‘The jeweler took the bracelet apart.’
- b. ha-tsamid **hitparek** me-atmo.
 the-bracelet dismantled.INTNS.MID from-itself
 ‘The bracelet fell apart of its own accord.’

Other traditional tests such as incompatibility with *by*-phrases and agent-oriented adverbs support the claim that the derived verbs are indeed unaccusative, (13).²

² For additional discussion of these diagnostics, see the recent discussion on reflexivity as anticausativity (Koontz-Garboden 2009; Beavers & Koontz-Garboden 2013a, b; Horvath & Siloni 2011, 2013; Lundquist et al. 2016; Schäfer & Vivanco 2016). I do not take an explicit stand on this issue in the current paper, focusing instead on the structures that generate different readings.

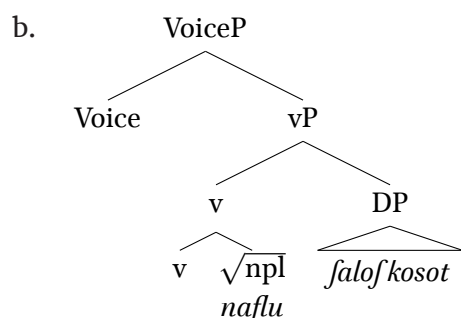
- (13) **ha-tsamid hitparek* { *al-jedej ha-tsoref* / *be-mejomanut* }.
 the-bracelet fell.apart.INTNS.MID by the-jeweler in-skill
 (int. ‘The bracelet was dismantled by the jeweler/skillfully’)

Two language-specific diagnostics have also been proposed in the literature: VS order and the possessive dative. These tests align with the ones above, as shown next.

2.2.2 Order of subject and verb

The word order of Modern Hebrew is typically SV(O) as seen in all of the examples above, but unaccusatives allow the verb to appear before the underlying object, (14a). Presumably this is because the underlying object stays low in its base-generated position, (14b). Unergatives do not allow VS order except for the marked structure known as “stylistic inversion”, (15); see Shlonsky (1987), Shlonsky & Doron (1991) and Borer (1995).

- (14) a. *nafl-u šalof kosot* be-ʃmone ba-boker. ✓ INTERNAL ARGUMENT
 fell.SMPL-3PL three glasses in-eight in.the-morning
 ‘Three glasses fell at 8am.’



- (15) #*navx-u šlofa klavim* be-ʃmone ba-boker. ✗ EXTERNAL ARGUMENT
 barked.SMPL-3PL three dogs in-eight in.the-morning
 ‘And thence barked three dogs at 8am.’ (Marked variant)

Anticausatives in *hitXaYeZ* allow VS order just like their counterparts in *niXYaZ*: (16) patterns with (14).

- (16) *hitpark-u šlofa galgalim* be-ʃmone ba-boker. ✓ INTERNAL ARGUMENT
 dismantled-3PL three wheels in-eight in.the-morning
 ‘Three wheels fell apart at 8am.’

2.2.3 Possessive datives

The second diagnostic is the possessive dative, a type of possessor raising. This construction has been claimed to only be possible with internal arguments (Borer & Grodzinsky 1986), though we return to critiques of it in Section 4.1.2.

A simple unaccusative like *nafal* ‘fell’ in the underspecified *XaYaZ* template is compatible with a possessive dative, (17a), as is a transitive construction, (17b), whereas an unergative verb leads to a deviant, affected interpretation, (17c). Anticausatives in *hitXaYeZ* are compatible with possessive datives, (18).

- (17) a. *nafal l-i ha-ʃaon*. ✓ INTERNAL ARGUMENT
 fell.SMPL to-me the-watch
 ‘My watch fell.’
 b. *dani ʃavar l-i et ha-ʃaon*. ✓ INTERNAL ARGUMENT
 dani broke.SMPL to-me ACC the-watch
 ‘Danny broke my watch.’

- c. #navax l-i ha-kelev. ✗ INTERNAL ARGUMENT
 barked.SMPL to-me the-dog
 ‘The dog barked and I was adversely affected’ (int. ‘My dog barked’)
- (18) hitparek l-i ha-jaon. ✓ INTERNAL ARGUMENT
 dismantled.INTNS.MID to-me the-watch
 ‘My watch broke.’

Having confirmed that anticausatives in *hitXaYeZ* are indeed unaccusative, I turn to the formalization.

2.3 Analysis

As noted earlier, there are seven distinct morphophonological verbal forms in Modern Hebrew, the “templates”. A few words on the system as a whole are in order before focusing on the analysis of an individual template. It has been suggested that analysis of the templates can rely on different values of the Voice head (Doron 2003; Arad 2005; Kastner 2016), originally proposed as the functional head introducing external arguments (Kratzer 1996). The typology of Voice heads follows recent proposals by Schäfer (2008) for German, Bruening (2014) for English, Alexiadou & Doron (2012) and Spathas et al. (2015) for Greek, Alexiadou & Doron (2012) for Hebrew, Wood (2015) for Icelandic, and Kastner & Zu (2015) for Latin. What this kind of framework does is to separate the syntactic and semantic behavior of Voice heads, leading to new analyses of argument structure alternations (Alexiadou et al. 2015; Schäfer 2017).

I take Voice to be instantiated in three different ways, depending on whether it has a [+D] feature, a [−D] feature or is underspecified for [±D]. This is an EPP feature, either requiring a DP in the specifier of its head, prohibiting a DP in its specifier or remaining agnostic about the specifier. In the discussion of *hitXaYeZ* we will mostly refer to Voice_[−D], a Voice head which bans the merger of a DP in its specifier, leaving the structure without a canonical subject.

- (19) a. **Voice_[−D]**
 A Voice head with a [−D] feature, prohibiting anything with a [D] feature from merging in its specifier.
 As typically assumed for unaccusative little *v* or unaccusative Voice, Voice_[−D] does not assign accusative case itself (Chomsky 1995) or through the calculation of dependent case (Marantz 1991).
- b. $[[\text{Voice}_{[-D]}]] = \lambda P_{\langle s,t \rangle} \cdot P$

The tripartite classification of Voice heads is not necessarily instantiated in all languages. In Hebrew, it has been argued that the three variants have distinct exponents (Kastner 2016, 2017).

- (20) a. Voice \leftrightarrow *XaYaZ*
 b. Voice_[−D] \leftrightarrow *niXYaZ*
 c. Voice_[+D] \leftrightarrow *heXYiZ*³

³ Notational matters: the template *heXYiZ* usually appears in the literature as *hiXYiZ*, with the first vowel an /i/. Speakers of my generation and at least one generation older use the /e/ form, and so I transcribe /e/ throughout. Conversely, the initial /h/ is usually dropped in speech. I retain it for two reasons. First, /h/ is still pronounced by some older speakers and certain sociolinguistic groups, especially marginalized ones (Schwarzwald 1981; Gafter 2014b). Second, the initial *h-* should help the non-Semitist reader distinguish this template from others.

Adding an agentive modifier, $\sqrt{\text{ACTION}}$, derives the two additional templates which we have already seen in (4)–(6) and which lie at the heart of the current study, *XiYeZ* and *hitXaYeZ*.⁴ This element is discussed in more detail in Section 3.2, where I explain how it brings about an external argument without requiring one in the syntax (which is what the feature [+D] does, but Voice_[+D] will not be discussed further.).

Combined with the two additional passive templates—which are derived by use of an additional Pass head (Alexiadou & Doron 2012)—we can generate all seven templates of Hebrew in the syntax.

- (21) a. [$\sqrt{\text{ACTION}}$ Voice] \leftrightarrow *XiYeZ*
 b. [$\sqrt{\text{ACTION}}$ Voice_[−D]] \leftrightarrow *hitXaYeZ*

Focusing back on *hitXaYeZ*, it is evident that *hit-* is a prefix, rather than a higher dummy DP or clitic (like French *se* in Labelle 2008 or German *sich* in Schäfer 2008) since its form is conditioned by tense and agreement, (22), a hallmark of agreement affixes (Nevins 2011).

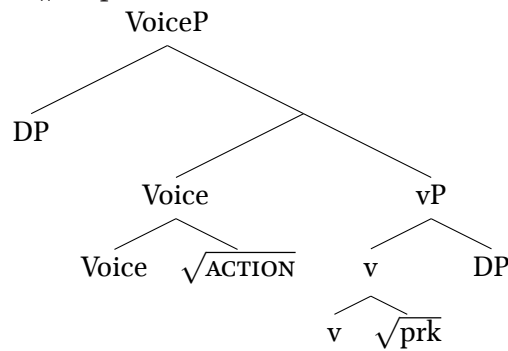
- (22) Some forms of *hitlabef* ‘he dressed up’:
 a. *hitlabef* Past 3SG.M
 b. *jitlabef* Future 3SG.M
 c. *titlabf-u* Future 2PL

Putting aside the exact morphophonological processes, here is how these functional heads work in the syntax. Anticausative verbs are derived by taking an existing transitive vP (one that has a direct object) and merging Voice_[−D], thereby detransitivizing the verb. This results in anticausative alternations as in (23a–b), between $\sqrt{\text{br}}$ with Voice and with Voice_[−D], and in (24a–b), between $\sqrt{\text{prk}}$ with Voice + $\sqrt{\text{ACTION}}$ and with Voice_[−D] + $\sqrt{\text{ACTION}}$. No external argument can be merged in the specifier of Voice_[−D], rendering the structures in (23b) and (24b) unaccusative.

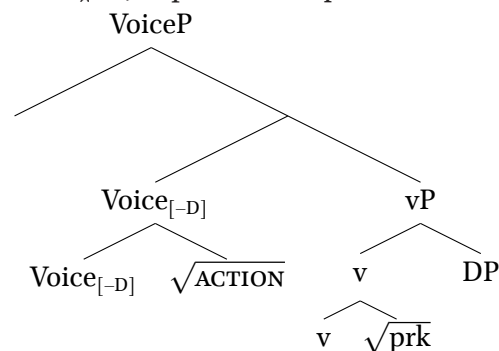
- (23) a. *XaYaZ*, *favar* ‘broke’
-
- VoiceP
 / \
 DP Voice vP
 / \
 v DP
 / \
 v $\sqrt{\text{br}}$
- b. *niXYaZ*, *nifbar* ‘got broken’
-
- VoiceP
 / \
 Voice_[−D] vP
 ni- / \
 v DP
 / \
 v $\sqrt{\text{br}}$

⁴ It appears that $\sqrt{\text{ACTION}}$ does not combine with Voice_[+D]; see Kastner (2016: Chapter 2.4.1) for discussion.

- (24) a.
- XiYeZ*
- ,
- pirek*
- ‘dismantled’



- b.
- hitXaYeZ*
- ,
- hitparek*
- ‘fell apart’



In (23), Voice introduces an external argument and Voice_[-D] blocks one. The same holds for (24) where the structure also contains the modifier $\sqrt{\text{ACTION}}$, whose exact workings will wait for the next section.

In this section I have set up the basic machinery needed to derive argument structure alternations in the language, allowing for a straightforward description of anticausatives using the functional head Voice_[-D]. The next section develops the system in order to account for the main empirical puzzle: reflexive verbs in Hebrew appear in only one of the templates, arguably the most marked one.

3 Reflexives

In what follows I turn to reflexives in *hitXaYeZ*. It has recently been proposed that dedicated reflexivizers are not necessary in order to derive reflexives in certain languages. I take this claim one step further based on Hebrew, arguing that dedicated reflexivizers are not necessary and that the same functional heads can be used to derive both reflexives and anticausatives, at least in this language. I develop the empirical picture in Section 3.1, present my analysis in Section 3.2 and return to tie a loose anticausative end in Section 3.3.

3.1 Background

The main phenomenon analyzed in this paper is as follows. The verbal template *hitXaYeZ* shows the same morphological marking for reflexives and anticausatives. By “reflexive verb” in this article I mean (25):

- (25)
- Canonical reflexive verb**

(i) A monovalent verb whose DP internal argument X is interpreted as both Agent and Theme, **and** (ii) where no other argument Y (implicit or explicit) can be interpreted as Agent or Theme, **and** (iii) where the structure involves no pronominal elements such as *himself*.

With this definition we focus on reflexives that are morphologically marked, rather than other reflexive strategies such as anaphora. These verbs in Hebrew are only attested in *hitXaYeZ*. A sample is given in (26).⁵

- (26) *hitgaleax* ‘shaved himself’, *hitraxets* ‘washed himself’, *hitnagev* ‘toweled himself down’, *hitaper* ‘applied makeup to himself’, *hitnadev* ‘volunteered himself’.

This kind of morphology is reminiscent of markers such as Romance *se*, German *sich* and Russian *-sja*. Yet unlike languages like French where *se* might be ambiguous between a number of readings (reflexive, reciprocal and anticausative), *hitXaYeZ* is never ambiguous in Hebrew for a given root (this generalization will be qualified in Section 4.2). French *se* can be used in reflexive, reciprocal and non-active contexts with a variety of predicates:

- (27) a. *French reflexives and reciprocals*, after Labelle (2008: 839)
 Les enfants **se** sont tous soigneusement **lavés**.
 the children *se* are all carefully washed.3PL
 ‘The children all washed each other carefully’ [reciprocal]
 ‘The children all washed themselves carefully’ [reflexive]
- b. *French middle* (Labelle 2008: 835)
 Cette robe **se lave** facilement.
 this dress *se* wash-3S easily
 ‘This dress washes easily.’
- c. *French anticausative* (Labelle 2008: 835)
 Le vase **se brise**.
 the vase *se* breaks-3S
 ‘The vase is breaking.’

But Hebrew *hitXaYeZ* is unambiguous. The verb *hitlabef* ‘got dressed’ is deterministically reflexive and cannot be used in an anticausative (or reciprocal) context, as shown by its incompatibility with ‘by itself’ in (28a). In contrast, the verb *hitatsben* ‘got annoyed’ is uniformly anticausative and cannot be used with an agent-oriented adverb such as ‘on purpose’ (Alexiadou & Anagnostopoulou 2004) in (28b).

- (28) *Hebrew*
- a. luk ve-pier **hitlabf-u**. (*me-atmam)
 Luc and-Pierre dressed.up.INTNS.MID-3PL from-themselves
 ‘Luc and Pierre got dressed’ [reflexive only]
- b. ha-saxkan **hitatsben** (*be-xavana) kfe-lo masru lo.
 the-player got.annoyed.INTNS.MID on-purpose when-NEG passed to.him
 ‘The player got annoyed when he wasn’t passed the ball.’

I argue below that this contrast ultimately derives from the lexical semantics of the root. *Dressing up* is usually something one does on oneself, while *annoying* is usually something that one does to someone else. This notion will be made precise in Section 3.3. For now, note that the root itself is not enough to force a reflexive reading. The root $\sqrt{\text{lbj}}$ from

⁵ Hebrew has verbs with reflexive-like readings in other templates. In particular, the “middle” template *niXYaZ* has verbs such as *nirjam le-* ‘signed up for’, *nitsmad le-* ‘stuck to’, and so on (an anonymous reviewer suggests *nisgar be-* ‘secluded himself in’, which may be subject to idiolectal variation). These verbs all take obligatory PP complements and as such have a different structure than that proposed here for reflexives. They are more similar to the figure reflexives discussed in Section 3.2.2; see Kastner (2016: Chapter 2.2) for an analysis of figure reflexives in *niXYaZ* and *hitXaYeZ*.

(28a) can appear in other templates with non-reflexive (and non-anticausative) meanings. Both examples in (29) contain transitive verbs, as evidenced by the direct object marker *et*.

- (29) a. viktor **lavaʃ** et ha-xalifa ʃelo.
Victor wore.SMPL ACC the-suit his
'Victor wore his suit.'
- b. ha-xajatim **helbiʃ-u** et ha-melex.
the-tailors dressed.up.CAUS-3PL ACC the-king
'The tailors dressed up the king.'

The point is once again that it is not enough for the root to be compatible with a reflexive reading in order for the verb to be reflexive. In English, for instance, *wash* and *shave* do not require any special morphological marking. But in Hebrew, both the root and the template combine to decide the meaning and argument structure of the verb, as I explain next.

3.2 Analysis

The intuition behind the analysis is as follows: reflexive verbs in *hitXaYeZ* consist of an unaccusative structure with extra agentive semantics. This combination is only possible if the internal argument is allowed to saturate the semantic function of an external argument, in a way I formalize below.

My proposed analysis consists of three parts, all independently necessary. The first piece of the puzzle is the non-active Voice head introduced in Section 2.3, Voice_[-D]. There, we noted that this head underlies argument structure alternations in a number of languages, including across four different templates in Hebrew (*XaYaZ* ~ *niXYaZ* and *XiYeZ* ~ *hitXaYeZ*). The second piece of the reflexive puzzle is the agentive modifier $\sqrt{\text{ACTION}}$, also introduced in Section 2.3 but not elaborated on yet. The third piece is a compositional mechanism operating in the syntax-semantics interface developed by Wood (2014), which I adopt. All three pieces can be shown to be independently needed (not only in Hebrew but for the theory as a whole) and their combination correctly predicts both the syntactic-semantic behavior of *hitXaYeZ* and its morphophonological makeup.

3.2.1 $\sqrt{\text{ACTION}}$

For this part of the puzzle I will modify the suggestion made by Doron (2003) according to which Hebrew has an agentive modifier with predictable spell-out and consistent semantics. The current section formalizes this element as $\sqrt{\text{ACTION}}$ and draws comparisons with other languages.

In Hebrew the modifier $\sqrt{\text{ACTION}}$ is attested in *hitXaYeZ* and in the "intensive" template *XiYeZ*. Consider first the typical difference between verbs in *XaYaZ* (with unmarked Voice) and *XiYeZ* (with Voice and $\sqrt{\text{ACTION}}$). In (30a) both agents and causes are possible with the "simple" *XaYaZ* verb *ʃavru* 'broke', but in (30b) only the agent is available with the "intensive" *XiYeZ* verb *ʃibru* 'broke to bits'.

- (30) Doron (2003: 20)
- a. {✓ ha-jeladim / ✓ ha-tiltulim ba-argaz } ʃavr-u et ha-kosot.
the-children the-shaking in.the-box broke.SMPL-PL ACC the-glasses
'{The children / Shaking around in the box} broke the glasses.'
- b. {✓ ha-jeladim / ✗ ha-tiltulim ba-argaz } ʃibr-u et ha-kosot.
the-children the-shaking in.the-box broke.INTNS-PL ACC the-glasses
'{The children / *Shaking around in the box} broke the glasses to bits.'

This element is phonologically overt. I follow Doron (2003) and Kastner (2017) in assuming that $XaYaZ$ is derived morphophonologically through the combination of Voice, v and the root, whereas $XiYeZ$ is the result of adding $\sqrt{\text{ACTION}}$. The Hebrew consonants $/p/$, $/b/$ and $/k/$ normally spirantize to $[f]$, $[v]$ and $[x]$ following a vowel, but not when $\sqrt{\text{ACTION}}$ is in the structure. This element has the phonological property that spirantization of the middle root consonant is blocked. In (30a), the medial $/b/$ of \sqrt{b} spirantizes to $[v]$ following a vowel. But in (30) it remains $[b]$, as discussed elsewhere in the phonological literature (Temkin Martínez 2008; Gouskova 2012; Kastner 2017).

An anonymous reviewer asserts that this morphophonological process has no bearing on the internal structure of these verbs. Two considerations lead me to disagree: whether the spirantization process is productive, and whether the blocking is grammatical. On both counts, the answer is affirmative. Temkin Martínez & Ivana Müllner (2016) conducted a nonce word study for Hebrew and found that native speakers normally spirantize the three stops, but do not spirantize them in medial position of $XiYeZ$, as would be expected. The results were not categorical, however, in line with previous work; Adam (2002) previously identified patterns of variation in the application of the phonological rule and the morphophonological one. Clearly, then, there is a variable phonological process which is blocked by grammatical means, indicating that these grammatical means should be part of the analysis.

As far as the semantics is concerned, the difference in possible interpretations between (30a) and (30b) reduces to whether or not overt $\sqrt{\text{ACTION}}$ is there to force an agentive reading. Doron (2003) proposed that this modifier carries the semantics of Action, which is slightly weaker than that of Agent. I believe that $\sqrt{\text{ACTION}}$ enforces a reading that has appeared in a number of recent works on argument structure. In their study of animacy in English, Italian, Greek and Russian, Folli & Harley (2008) considered a range of data in which the acceptability of an external argument depends on whether it is *teleologically capable* of causing the event (as opposed to an agency or animacy restriction). In a study of manner and causation in English, Beavers & Koontz-Garboden (2012) used the notion of *actor* and *non-actor* to discuss events in which an animate causer is or is not responsible for the consequences of its act, distinguishing causation from actorhood. In two studies of external arguments in nominalizations, Sichel (2010) and Alexiadou et al. (2013) similarly differentiated agentivity from *direct causation*. In a study of reflexives in Greek (which we return to in Section 5.2), Spathas et al. (2015) identified the prefix *afto-* as an *anti-assistive* modifier, again performing a similar semantic function. And in Tamil, the suffix *-ko* adds affective semantics in a way that is otherwise difficult to pin down immediately (Sundaresan & McFadden 2017).

To be clear, the crosslinguistic claim is not that $\sqrt{\text{ACTION}}$ is the sole element responsible for all of these cases. Instead, the pretheoretical picture which emerges from these works is that natural language has a way of making this fine-grained distinction, a distinction we are not yet fully able to explain. Since this phenomenon appears to be semantic in nature (rather than demonstrably syntactic), it is formalized in Hebrew using $\sqrt{\text{ACTION}}$. As a root, this element has phonological and semantic content but no syntactic requirements. Not much hinges on whether this element is a root or a functional head in this language; I take the simple view that it has no syntactic influence, and so is root-like. The question of what other such “underspecified” roots might exist in natural language remains an open one for further crosslinguistic research.

Formalizing this characterization of $\sqrt{\text{ACTION}}$, I assume that it triggers an agentive alloeme of Voice, following Doron (2003, 2014), opting not to tread in the murky waters of distinguishing agentivity from “actorhood” and “direct causation”. The relevant morphemes have the denotations in (31): $\sqrt{\text{ACTION}}$ requires, in the semantics, that Voice introduce an Agent rather than a Cause.

- (31) a. $[[\text{Voice}]] \leftrightarrow \lambda e \lambda x. \text{Agent}(x, e) / \text{---} \sqrt{\text{ACTION}}$
 b. $[[\text{Voice}]] \leftrightarrow \lambda e \lambda x. \text{Cause}(x, e) \text{ or } \lambda e \lambda x. \text{Agent}(x, e)$, as in Section 2.1.
 c. $[[\text{Voice}_{[-D]}]] \leftrightarrow \lambda e \lambda x. \text{Agent}(x, e) / \text{---} \sqrt{\text{ACTION}}$
 d. $[[\text{Voice}_{[-D]}]] \leftrightarrow \lambda P_{\langle s, t \rangle}. P$

The intuition for reflexives, then, is that a construction in which there is only an internal argument, but in which there is also agentive semantics, leads to an interpretation in which the internal argument is also the agent. The next section describes the derivational mechanism which lets one argument receive two thematic roles.

3.2.2 Delayed saturation

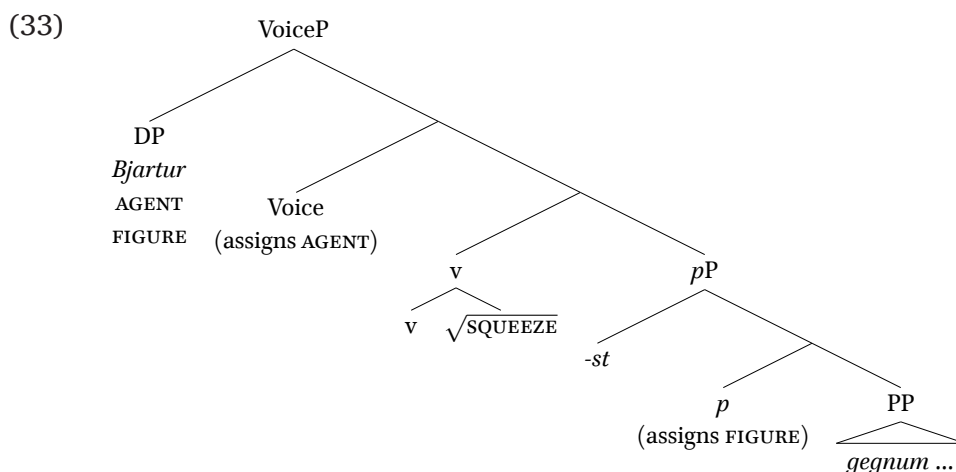
The derivational framework adopted in this paper allows for a separation of syntactic and semantic requirements of functional heads. The former hold in the syntax proper, while the latter are computed at LF. This being the case, it is possible for a given syntactic head to impose a semantic requirement that is not fulfilled immediately but only later in the derivation. This possibility, which I call *delayed saturation*, has been investigated in recent work on argument structure alternations and possession in a number of languages by Wood (2014, 2015), Wood & Marantz (2017) and Myler (2016). An example from Icelandic illustrates the basic idea; a formalization for reflexives follows in Section 3.2.3.

Icelandic exhibits a specific kind of reflexive-like construction, the “figure reflexive”, in which an argument is interpreted both as an agent and as a *figure* (theme) of a motion event. These constructions appear with the clitic *-st*, as in (32).

- (32) *Icelandic* (Wood 2014: 1399)
 Bjartur **tróð-st** gegnum mannþröngina.
 Bjartur.NOM squeezed-ST through the.crowd
 ‘Bjartur squeezed (himself) through the crowd.’

On the analysis of Wood (2014) the subject of PPs, the *figure*, is introduced by a functional head *p* merging above the PP, following independently made suggestions along similar lines (van Riemsdijk 1990; Rooryck 1996; Koopman 1997; Gehrke 2008; Den Dikken 2003, 2010; Svenonius 2003, 2007, 2010). In this system, *p* assigns the thematic role of FIGURE and Voice assigns AGENT. These labels indicate semantic interpretation at LF, rather than traditional theta-roles.

The structure for (32) is given in (33). Wood’s insight is that *-st* serves as an expletive, filling Spec,*pP* in the syntax without contributing any semantics. The next DP merged in the structure, *Bjartur*, will then saturate both Voice’s semantic role (AGENT) and the role of FIGURE introduced by *p*. A variety of diagnostics show that the verb is agentive, with the DP *Bjartur* merged in Spec,VoiceP.



The full semantic details can be found in Wood (2014, 2015). The intuition is that a function can remain unsaturated by the syntactic arguments of its head; in this case the semantic role of FIGURE is not saturated by *-st*, which is the element introduced by *p* in the syntax. Instead, an argument introduced later on (*Bjartur*) saturates the predicate. What I call delayed saturation is more of a side effect of the nature of the derivation than a novel mechanism. It is of course not the norm for saturating functions, since otherwise *John kicked* could mean ‘John_i kicked John_i’ with delayed saturation of the Agent role.

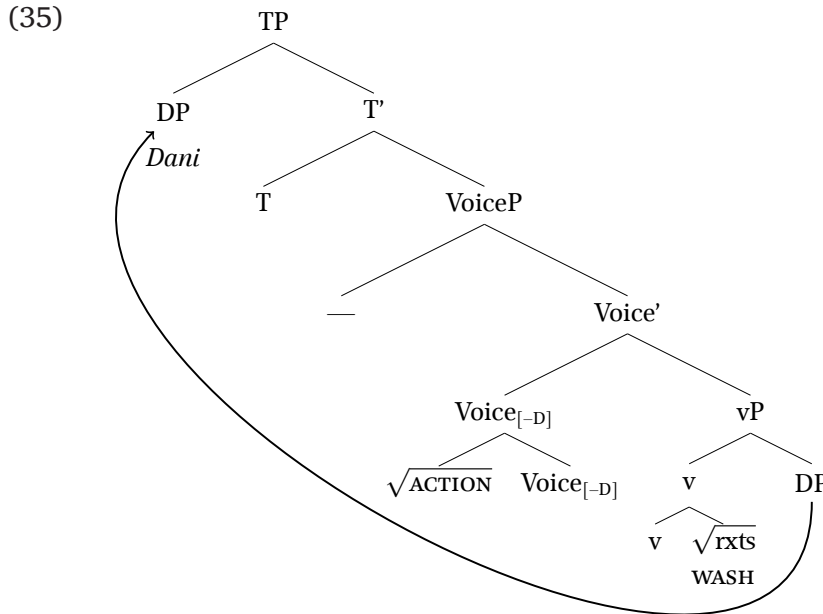
In what follows I show how delayed saturation is instantiated in the specific environment of Hebrew reflexives.

3.2.3 Putting the pieces together

We are now armed with a non-active Voice head, an agentive modifier and a formalism allowing for an argument to saturate a function lower in the tree. Combining the three should give us an internal argument, which is nevertheless interpreted as an agent. The structure in (35) and the semantic derivation in (36) flesh out the derivation of the reflexive verb in (34).

- (34) dani **hitraxets**.
 Danny washed.INTNS.MID
 ‘Danny washed (himself).’

The argument DP starts off as the internal argument. No external argument is merged in the specifier of Voice_[-D], but the specifier of T still needs to be filled. The internal argument raises directly to Spec,TP, say to satisfy the EPP, saturating the AGENT role of Voice_[-D] in delayed fashion. Whereas in the Icelandic example it was the FIGURE role whose saturation was delayed until the merger of Spec,TP, here it is Agent(x, e) which cannot be satisfied immediately. The crucial points in this derivation are (36e) and (36g): once the internal argument raises to Spec,TP, the derivation converges.



- (36) a. $\llbracket v \rrbracket = \llbracket v + \sqrt{\text{rxts}} \rrbracket = \lambda y \lambda e. \text{wash}(e) \ \& \ \text{Theme}(y, e)$
 b. $\llbracket vP \rrbracket = \llbracket v + \sqrt{\text{rxts}} \rrbracket(\text{Danny}) = \lambda e. \text{wash}(e) \ \& \ \text{Theme}(\text{Danny}, e)$
 c. $\llbracket \text{Voice}_{[-D]} \rrbracket = \llbracket \text{Voice}_{[-D]} + \sqrt{\text{ACTION}} \rrbracket = \lambda e \lambda x. \text{Agent}(x, e)$
 d. *Event Identification:*
 $\llbracket \text{Voice}' \rrbracket = \lambda e \lambda x. \text{wash}(e) \ \& \ \text{Theme}(\text{Danny}, e) \ \& \ \text{Agent}(x, e)$

- e. *Since no argument may be merged in the specifier of Voice_[-D], the function is passed up:*
 $\llbracket \text{VoiceP} \rrbracket = \lambda e \lambda x. \text{wash}(e) \ \& \ \text{Theme}(\text{Danny}, e) \ \& \ \text{Agent}(x, e)$
- f. *Assuming $\llbracket T \rrbracket = \text{Past}(e)$:*
 $\llbracket T' \rrbracket = \lambda e \lambda x. \text{wash}(e) \ \& \ \text{Theme}(\text{Danny}, e) \ \& \ \text{Agent}(x, e) \ \& \ \text{Past}(e)$
- g. *The internal argument raises to the specifier of T and saturates the open predicate:*
 $\llbracket \text{TP} \rrbracket = \llbracket T' \rrbracket (\text{Danny}) = \lambda e. \text{wash}(e) \ \& \ \text{Theme}(\text{Danny}, e) \ \& \ \text{Agent}(\text{Danny}, e) \ \& \ \text{Past}(e)$

This analysis showcases what I mean when I correlate complex meaning with complex morphology. On the meaning side of things, reflexives in Hebrew do not come from a dedicated functional or lexical item. There must be some conspiracy of factors in order to derive a reflexive reading. In this, reflexives are different than anticausatives, which can be derived simply by using the head Voice_[-D] (Section 2.3). The complex structure of reflexives is tracked by complex morphology: verbs in *hitXaYeZ* have two distinguishing morphophonological properties, namely the prefix and the non-spirantized medial root consonant *Y*.

We now have answers to the questions posed at the beginning of the paper: why *hitXaYeZ* is the one template instantiating reflexive verbs, and why this template in particular. Different elements are necessary in order for a reflexive reading to arise, and their combination in the morphophonology results in this template. As returned to in Section 6.2, alternative approaches to Hebrew cannot answer these questions, since they treat each template as an independent morpheme. I use distinct functional heads; Table 1 summarizes the syntactic and semantic contributions of the heads utilized thus far. Empty cells are underspecified.⁶

The derivation also required movement from the internal argument position. There is more to be said about this kind of movement; that thread will be picked up in Section 4. Before that can be addressed, we will return once more to anticausatives: at this point, the theory lacks a formalization of why anticausatives and reflexives are different even though their constituent elements are similar. If the morphosyntax is identical, why is the morphosemantics different? The general answer I give is that different classes of roots impose different constraints in the semantics. With Hebrew anticausatives, the requirement on the agent role is relaxed in a way that is made explicit next.

3.3 The semantics of anticausatives

The analysis presented here requires *hitXaYeZ* anticausatives to be built using $\sqrt{\text{ACTION}}$, accounting for their morphophonological form. But this modifier cannot do its regular semantic work, otherwise we would expect an agent for anticausatives, contrary to fact.

Table 1: The requirements of some functional heads in the Hebrew verb.

Heads		Syntax	Semantics	Phonology
Voice				XaYaZ
Voice	$\sqrt{\text{ACTION}}$		Agentive	XiYeZ
Voice _[+D]		Obligatory external argument		he-XYiZ
Voice _[-D]		No external argument		ni-XYaZ
Voice _[-D]	$\sqrt{\text{ACTION}}$	No external argument	Agentive	hit-XaYeZ

⁶ The combination of Voice and $\sqrt{\text{ACTION}}$ cannot lead to a reflexive verb since external Merge would generate a subject from the numeration in Spec,Voice (“Merge over Move”). Alternatively, Oseki (2017) posits that $[-D]$ is a prohibition only on External Merge, not Internal Merge, following a suggestion by Jim Wood. This latter possibility is more in line with the account of Greek in Section 5.2.

I propose that the rule of allosemy (semantic interpretation) in (37) removes the agentivity requirement of $\sqrt{\text{ACTION}}$ for roots such as $\sqrt{\text{pr}\bar{\text{x}}}$, seen for example in (24). This change renders the resulting verb *hitparek* ‘fell apart’ anticausative, rather than a potential reflexive ‘tore himself to pieces’. The process can be thought of as similar to impoverishment (Bonet 1991; Noyer 1998) but in the semantics (Nevins 2015).⁷

$$(37) \quad \llbracket \sqrt{\text{ACTION}} \rrbracket = \lambda P.P / \text{Voice}_{[-D]} \text{ — } \{ \sqrt{\text{XYZ}} \mid \sqrt{\text{XYZ}} \in \sqrt{\text{pr}\bar{\text{x}}} \text{ ‘DISMANTLE’}, \sqrt{\text{bjl}} \text{ ‘COOK’}, \sqrt{\text{ptst}} \text{ ‘EXPLODE’}, \dots \}$$

I suggest that roots like $\sqrt{\text{pr}\bar{\text{x}}}$ and $\sqrt{\text{bjl}}$ are *Other-Oriented* in their lexical semantics (Schäfer 2012; Alexiadou 2015; Spathas et al. 2015): one usually dismantles and cooks other things, not one’s self. The complementary set of *Self-Oriented* roots are those whose lexical semantics are oriented towards the self (the speaker): showering, shaving and so on are normally actions that one performs on oneself. In the syntactic configuration discussed here they give rise to reflexive verbs. The formalization in (37) reflects the fact that any analysis of Hebrew must distinguish between at least two classes of roots in *hitXaYeZ*. This distinction is called for because a given verb in this template is unambiguous: either anticausative or reflexive (barring complications explored in Section 4.2).⁸

Importantly, the influence of these roots holds only at the interface with semantics; (37) is a rule operating on semantic interpretation, not syntax or phonology. As is apparent from the facts of *hitXaYeZ* and from the cases mentioned in Section 2.1, the semantics of roots influences the structures they may appear in. The current proposal allows us to delineate the power of roots and where they may exert it. Additional consequences of this approach are illustrated in Section 4.2.

3.4 Summary

This section tackled the main puzzle of the paper: the fact that reflexive verbs appear only in the template *hitXaYeZ*, a template that is demonstrably complex morphophonologically and which instantiates anticausative verbs as well. Three independently needed components were used: a non-active Voice head ($\text{Voice}_{[-D]}$), used in argument structure alternations elsewhere in the language; an agentive modifier ($\sqrt{\text{ACTION}}$), used elsewhere in the language; and a general compositional mechanism of delayed saturation.

It was also shown that this approach explains why the same morphology might signal different syntactic derivations. A correlation was identified between complex syntax/semantics and complex morphophonology: on the present theory, reflexive readings do not come as primitives but arise as the result of specific heads combining. Since each of these heads also has its own exponent, the marked syntax/semantics is reflected in marked morphology, thereby explaining why it is this specific morphology (the template *hitXaYeZ*) which is used for this specific kind of verb (reflexive).

In addition, the analysis supported a division of roots into two kinds which can be distinguished on lexical semantic grounds. We have also scratched the surface of restrictions and triggers of A-movement. These two issues are expounded on next: how syntactic structure, namely unaccusativity, interacts with the root’s own characteristics.

⁷ Levin & Rappaport Hovav (1995) and Reinhart (2002) suggest that decausativization can only occur if the external argument of the causative verb is not specified with respect to its thematic role, i.e. can be a Cause. If verbs in *XiYeZ* are indeed agentive as discussed above, but can nonetheless be decausativized into an anticausative in *hitXaYeZ*, this generalization will need to be amended.

⁸ This analysis can be construed as assuming that reflexive verbs are the default in *hitXaYeZ*, with anticausatives requiring the extra rule in (37). It is a relevant question for future research whether this is the case. For example, a wug study with nonce forms in *hitXaYeZ* could test whether native speakers are more inclined to interpret these new forms as reflexive or anticausative.

- b. *Baseline example, internal argument raises*
 [Molti esperti] saranno invitati ____ .
 many experts will.be invited
 ‘Many experts will be invited.’ (= a)

(42) *Italian*

- a. *Ne-cliticization allowed out of a surface object*
Ne saranno invitati [molti ____].
 of.them will.be invited many
 ‘Many of them will be invited.’
- b. **Ne-cliticization disallowed out of a moved, “deep” object*
 [Molti ____] **ne** saranno invitati.
 many of.them will.be invited
 (int. ‘Many of them will be invited.’)

Here is what is at stake: if VS order in Hebrew is a “surface” unaccusativity diagnostic, then this would explain why reflexives do not pass it – the internal argument has moved out of the VP and into subject position. Unfortunately, there is little additional evidence for or against the claim that VS order in Hebrew is a “surface” unaccusativity diagnostic. Instead, we must leave this as a conjecture to be explored in a related line of inquiry: why can Hebrew anticausative arguments remain low and ignore the EPP?

The word order facts introduced in Section 2.2 indicate that an anticausative object may either stay low or raise to Spec,TP. But the reflexive internal argument must raise if the derivation is to converge; if it does not, no argument satisfies the Agent role and the derivation crashes at the interface with LF.

I have not given an explicit account of the optionality of movement for anticausative arguments, which unlike reflexive arguments are allowed to stay low. This, I believe, is a challenge for all research on unaccusativity. As seen in (41a–b), the internal argument in Italian may either stay low or raise, with no apparent difference in interpretation.

A number of open questions remain: why do Italian and Hebrew allow for this “optional” movement, allowing unaccusatives to remain low? If the EPP forces movement to Spec,TP, can it be “turned off” or satisfied in another way (Alexiadou & Anagnostopoulou 1998)? The answers to these questions lie beyond the scope of the current account. But when similar questions have been tackled, the resulting accounts suggest that VS order is not necessarily about unaccusativity *per se*, but about a certain syntactic configuration that has particular semantic and information-structural consequences as well, in line with the analysis advanced here (Borer 2005; Alexiadou 2011). It is my hope that the phenomena investigated in the current paper can serve as a stepping stone for further work on this topic.

4.1.2 Possessive dative

The other diagnostic proposed in the literature on Hebrew is the possessive dative, which has recently been re-characterized by Gafter (2014a) and Linzen (2014, 2016) as a diagnostic of saliency or animacy rather than unaccusativity. Gafter (2014a) gives the following contrast by way of example:

- (43) a. ha-karborator **neheras** **le-dan**.
 the-carburetor ruined.MID to-Dan
 ‘Dan’s carburetor got ruined.’
- b. *ha-karborator **neheras** **la-mexonit**.
 the-carburetor ruined.MID to.the-car
 (int. ‘The car’s carburetor got ruined.’)

The animate possessor in (43a) is acceptable, but the inanimate possessor in (43b) is not. Taking these kinds of data as his point of departure, Gafter (2014a) conducted a rating study to test whether the prominence of the possessor was the crucial factor driving grammaticality in the possessive dative, where prominence is defined both in terms of animacy and definiteness. The experiment bore out this prediction.

In a reflexive construction such as that in (39), the to-be-possessed argument ('cats') is animate since it is the agent of a reflexive predicate. As Gafter shows, this is a case where acceptability of possessive datives suffers when both possessor and possessee are animate and salient in the discourse.

A prediction made by this account is that a 3rd person possessive dative should not be possible with a 1st person possessee.⁹ This seems to be correct:

- (44) *niftsa-ti la-kvutsa.
 injured.MID-1SG to.the-team
 (int. 'I got injured, and I was part of the team.')

On the one hand, these findings provide us with an out by denying the applicability of the diagnostic. If the possessive dative is not really an unaccusativity diagnostic, then the fact that reflexives do not pass it does not argue against an unaccusative analysis. On the other hand, this failure to pass the diagnostic may be interesting in its own right. As a first pass, it shows that affectedness has a number of syntactic as well as semantic causes.

4.1.3 Unaccusative and unergative reflexives

To summarize the discussion of these two unaccusativity diagnostics, I have argued that the broad notion of "unaccusativity" is not enough to describe reflexives in Hebrew (and is too broad in general for other phenomena; Irwin 2012; Alexiadou 2011, 2014). A similar idea will be necessary for the discussion of Greek in Section 5.2. If unaccusativity means that the surface subject started off as the internal argument, then surface unaccusativity diagnostics might not identify reflexive structures in which the internal argument raised to subject.

An anonymous reviewer asks whether there are verbal constructions that contain only VoiceP, in which case the internal argument of reflexives cannot raise to Spec,TP. Unfortunately, the relevant constructions do not deliver clear results in Hebrew. Infinitives have a marked morphological form, presumably the spell-out of non-finite T, e.g. *le-hitlabef* 'to-get.dressed'. The next candidate is nominalizations, but it is well-known that these can trigger existential closure over the external argument (Grimshaw 1990; Bruening 2013: 31): the Agent is not overtly named in *The destruction of the city*.

Granted, with no appropriate tests for deep unaccusativity in Hebrew, the idea that reflexives are unaccusative remains a working hypothesis to be explored rather than a conclusion based on established diagnostics. Nevertheless, semantically the argument of reflexive verbs does behave like an internal argument in that it undergoes change of state: if Dina shaves herself, she is now in a shaven state. If John applies make-up to himself, he is now made-up. This behavior is typical of internal arguments (Dowty 1991; Alexiadou & Schäfer 2013).

The debate on whether reflexives are unaccusative or unergative goes back at least to Kayne (1975) and Marantz (1984); see Chierchia (2004), Doron & Rappaport Hovav (2009) and Sportiche (2014) for recent contrasting views. The answer may vary by language, depending on how a given language promotes its internal arguments. What I have suggested here is that minimal differences between deep and surface unaccusatives might be findable in other languages, even if they are not obvious in Hebrew.

⁹ As pointed out to me by Stephanie Harves.

4.2 The right root in the right place

The final issue to be raised before evaluating alternative theories is the one relating to the difference between reflexives and anticausatives. In this section I address the question of which roots can be embedded in different contexts: if root A derives a reflexive verb and root B an anticausative one, is it necessary to postulate different derivations or would it be simpler to adopt a lexicalist notion in which each verb projects its own argument structure?

Recent work on argument structure has seen a spate of analyses proposing distinctions between different kinds of roots; see the ontologies proposed by Anagnostopoulou & Samioti (2014) and Levinson (2014), for example. Following Alexiadou (2015), I have made a distinction between *Self-Oriented* roots and *Other-Oriented* roots (Section 3.3).¹⁰ These are not syntactic notions but semantic ones, and their purpose is to give us tools with which to discuss different interpretations of verbal structures. The emerging picture for Hebrew is presented in Table 2, which summarizes the different readings that emerge in *hitXaYeZ*. Reflexives and anticausatives were the subject of the current paper. The framework allows for similar analyses of other verbs in the same template, such as the reciprocals noted earlier on in (4)–(6), but reciprocals themselves will not be dealt with here; it has been argued by Bar-Asher Siegal (2016) that reciprocalization in Hebrew is tangential to the choice of template, since the same reciprocalization strategy (e.g. a plural subject) is possible in a number of templates. I will tentatively assume that a unified analysis of reciprocals in Hebrew would pick out a subset of templates, and not a unique one like with reflexives and *hitXaYeZ*.

In anticipation of future work, I would like to ask how deterministic these readings are. Compare $\sqrt{\text{ptsts}}$ EXPLODE with $\sqrt{\text{lbj}}$ WEAR: the former gives rise to anticausative *hitpotsets* and the latter to reflexive *hitlabef*.

- (45) a. $\sqrt{\text{ptsts}}$ Other-Oriented *hitpotsets* ‘exploded’ (anticausative)
 b. $\sqrt{\text{lbj}}$ Self-Oriented *hitlabef* ‘dressed up’ (reflexive)

Interestingly, some Other-Oriented roots can be treated as Self-Oriented in the right context, (46), but Self-Oriented roots cannot be interpreted as Other-Oriented, (47).

- (46) *Other-Oriented* $\sqrt{\text{ptsts}}$ in a reflexive context, *licit*
 le-marbe ha-mazal, ha-mexabel ha-mitabed **hitpotsets** be-migraʃ rek.
 to-much the-luck, the-terrorist the-suiciding exploded.INTNS.MID in-lot empty
 ‘Luckily, the suicide bomber blew himself up in an empty lot.’
- (47) *Self-Oriented* $\sqrt{\text{lbj}}$ in a disjoint context, *illicit*
 ‘The king was still in his underwear minutes before the ceremony. His assistants rushed to dress him up in expensive clothes, a robe and a crown. ...
 *lifnej je-hu hevin ma kara hu kvar **hitlabef**.
 before COMP-he understood.CAUS what happened he already dressed.up.INTNS.MID
 (... ‘before he could understand what had happened, he had already dressed up.’)

Table 2: A typology of verbs in *hitXaYeZ*.

	Self-Oriented root	Other-Oriented root	...
$\sqrt{\text{ACTION} + \text{Voice}_{[-D]}}$	Reflexive	Anticausative	Reciprocals, etc.

¹⁰ Alexiadou (2015) actually suggested a tripartite division based mostly on Dutch, in which some roots are inherently reflexive (e.g. $\sqrt{\text{SHAME}}$), some naturally reflexive/reciprocal (e.g. $\sqrt{\text{WASH}}$) and some naturally disjoint (e.g. $\sqrt{\text{HATE}}$). I will make do with a binary distinction.

A similar example is given by Beavers and Andrew Koontz-Garboden (2013b).

An anonymous reviewer similarly claims that the verb *hitnaka* ‘got himself clean’ is ambiguous between an anticausative reading, (48a), and a reflexive reading (see Doron 2003: 11 for a similar claim). Perhaps the crucial factor here is the type of event, interacting with the animacy of the subject, i.e. the internal argument: (48b) is only natural with the adverbial and purpose clause.

- (48) a. ha-oto **hitnaka** (me-atmo).
 the-car cleaned.INTNS.MID of-itself
 ‘The car became cleaned.’
- b. jaron **hitnaka** ?(maher kedej lehaspik lehagia
 Yaron cleaned.INTNS.MID quickly in.order to.make.it to.arrive
 la-mesiba ba-zman).
 to.the-party on.the-time
 ‘Yaron cleaned himself quickly in order to make it to the party on time.’

Individual datapoints aside, I take this discussion to indicate that the rule of semantic impoverishment proposed in Section 3.3 itself depends on the lexical semantics of the root (as would be expected at LF). Recall, for instance, that *hitparek* ‘fell apart’ cannot mean ‘tore himself to bits’, so not all Other-Oriented roots can be coerced into reflexives.¹¹ I would not be surprised if this difference indicates a further distinction that can be drawn between classes of roots, perhaps based on their lexical semantics, but I leave this idea to follow-up work on the interaction of roots and syntax.

We will now turn to alternative theories of reflexivity in Section 5 and alternative theories of the Hebrew verb in Section 6.

5 Alternative theoretical views

5.1 The semantics of reflexives

In the derivation of reflexives in Section 3.2.3, the internal argument raises to Spec,TP in order to be interpreted twice: once as Theme and once as Agent. This analysis will now be contrasted with an alternative view of reflexivity, namely one positing a silent anaphor like the anaphora in e.g. Heim & Kratzer (1998), though the same problems arise for other alternatives such as arity reducers (Szabolcsi 1992; Reinhart & Siloni 2005) and the z-Combinator (Jacobson 1999).

On the silent anaphor approach, a silent pronominal is the internal argument of a reflexive verb and the overt DP is merged as the external argument. But there are a number of problems with this kind of alternative. First, this treatment assumes a covert object. It is unclear why this silent pronoun should be possible only in reflexive environments. Why can it not be used as a reflexive object in other templates, for example in *XaYaZ*, (49a), and *heXYiZ*, (49b)?

- (49) a. ha-jeladim_i **axl-u** (***pro**_i).
 the-children ate.SMPL-3PL
 ‘The children ate.’
 (Not possible: *‘The children ate themselves’)

¹¹ Similarly, a reciprocal verb in this template must have symmetrical entailments. In other words, a Self-Oriented root like $\sqrt{\text{lbj}}$ ‘DRESS’ cannot be coerced into a reciprocal.

(i) josi ve-dani **hitlabf-u**.
 Yossi and-Danny dressed.up.INTNS.MID-3PL
 ‘Yossi and Danny got dressed.’ (not: ‘Yossi and Danny dressed each other’)

complex (prefix and de-spirantization) and also semantically complex. The two phenomena were tied together by implicating two functional heads in the structure: marked morphophonology signals internal structure and corresponds to marked syntax and semantics, again the result of complex internal structure.

The differences between the semantic approaches are summarized in (52). On balance, it appears that *something* special needs to be said about reflexives within the VoiceP domain, but at least for the Hebrew case the current proposal requires fewer stipulations.

(52) Reflexivity in *hitXaYeZ*: strengths and weaknesses of different frameworks.

	Current system	Traditional approaches
Mechanism	Movement	Silent reflexive anaphor or: Arity reduction or: z-Combinator
Advantages	No reflexivizers Compose independent heads	Standardly assumed
Disadvantages	Quantified subjects	Stipulated reflexivizers Cross-templatic overgeneration Additional assumptions required

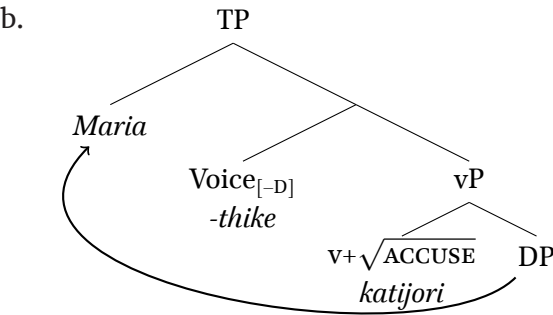
5.2 Afto- reflexives in Greek

The analysis of *hitXaYeZ* reflexives is similar to a recent analysis of reflexive verbs in Greek. In that language, reflexives can be derived by using Voice_[−D] and a prefixal modifier *afto-*; the example elaborated on below is *afto-katijori-thike* ‘accused himself/herself’. In work on this construction, Alexiadou & Schäfer (2013), Alexiadou (2015) and Spathas et al. (2015) argue that these reflexives are the result of combining two morphemes with the root: a Middle Voice head and the bound anti-assistive intensifier *afto-*. Let us see how their analysis works and then how it compares with ours.

5.2.1 The proposal

Greek Middle Voice is typical of anticausative, passive and middle verbs in the language, similar to Voice_[−D] (Alexiadou & Doron 2012). Mediopassives as in (53) are unaccusative.

- (53) *Greek medio-passive*
- a. I Maria **katijori-thike**.
 the Maria accused-NACT.3SG
 ‘Maria got accused’, ‘Maria was accused.’



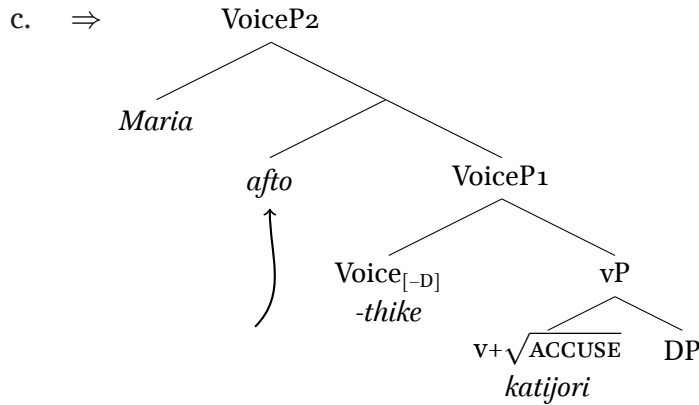
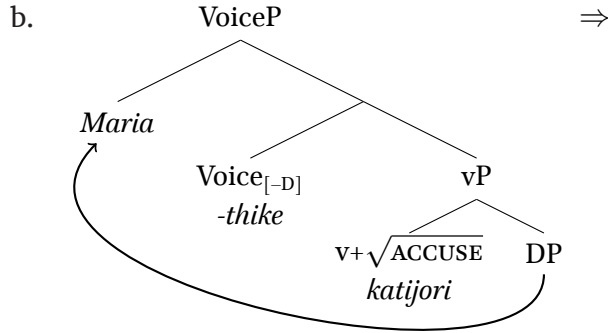
For certain roots, a reflexive can be built on the basis of medio-passives like (53). The reflexive construction is derived using *afto-*, an “anti-assistive intensifier” similar to $\sqrt{\text{ACTION}}$ and to English non-reflexive *herself* which is exemplified in (54).

- (54) She built the house **herself**_{anti-assistive}*

According to Spathas et al. (2015), the Greek equivalent of Voice_[-D] blocks an external argument from being merged in its specifier, but the internal argument is allowed to undergo A-movement to Spec, VoiceP. The prefix *afto-* then “tucks in” and adjoins to VoiceP, (55b–c).

- (55) *Greek reflexive*

- a. I Maria **afto-katijori-thike**
the Maria self-accused-NACT.3SG
'Maria accused herself.'



In the semantics, *afto* states that its associate (the internal argument, being the only argument in the structure) is the sole Agent in every sub-event of the event, so that Agent and Theme end up being coreferential. The denotations in (56) are adapted from Spathas et al. (2015: 1330, 1332, 1335).

- (56) a. $\llbracket \text{VoiceP} \rrbracket = \lambda e. \exists x. \text{accuse}(e) \ \& \ \mathbf{Theme}(\mathbf{Mary}, e) \ \& \ \text{Agent}(x, e)$ (124c)
- b. *The internal argument undergoes A-movement, creating a derived predicate which inserts the variable binder λy (Heim & Kratzer 1998; Nissenbaum 2000).*
 $\llbracket \text{VoiceP1} \rrbracket = \lambda y \lambda e. \exists x. \text{accuse}(e) \ \& \ \mathbf{Theme}(y, e) \ \& \ \text{Agent}(x, e)$ (126)
- c. $\llbracket \text{afto}_{\text{anti-assistive}} \rrbracket = \lambda f \lambda y \lambda e. f(y, e) \ \& \ \forall e' \forall x. (e' \leq e \ \& \ \text{Agent}(x, e')) \rightarrow x = y$ (147)
- d. $\llbracket \text{VoiceP1} + \text{afto} \rrbracket = \lambda y \lambda e. \exists x. \text{accuse}(e) \ \& \ \mathbf{Theme}(y, e) \ \& \ \text{Agent}(x, e) \ \& \ \forall e' \forall x. (e' \leq e \ \& \ \text{Agent}(x, e')) \rightarrow x = y$ (128)
- e. $\llbracket \text{VoiceP1} + \text{afto} \rrbracket(\mathbf{Mary}) = \lambda e. \exists x. \text{accuse}(e) \ \& \ \mathbf{Theme}(\mathbf{Mary}, e) \ \& \ \text{Agent}(x, e) \ \& \ \forall e' \forall y. (e' \leq e \ \& \ \text{Agent}(y, e')) \rightarrow y = \mathbf{Mary}$ (135)
 “[A] description of events of someone accusing Mary such that Mary is the agent in all sub-events of that event. This is a reflexive interpretation.”

The two affixes *-thike* (Voice_[-D]) and *afto-* (anti-assistive $\approx \sqrt{\text{ACTION}}$) combine to give a reflexive reading: the former contributes by restricting the number of arguments in

the clause and the latter contributes by specifying that the existing argument is the only Agent. To reiterate, there is no dedicated reflexivizer in this structure.

This kind of derivation also depends on the lexical semantics of the root. *Afto*-reflexives are not possible with the Greek class of Naturally Reflexive roots (similar to Self-Oriented roots, Spathas et al. 2015: 1337). It is only in combination with *afto*- and the right root class that the internal and external arguments are forced to be coreferential, leading to a reflexive interpretation.

5.2.2 Heads and roots crosslinguistically

A number of differences between the analyses of Greek and Hebrew are highlighted in (57). In all cases, the differences are expressed in terms that are natural in the current framework.

- (57) a. Greek *afto*- attaches to the extended projection of Voice_[-D], whereas Hebrew $\sqrt{\text{ACTION}}$ modifies either Voice or Voice_[-D].
 b. Greek *afto*- is incompatible with Naturally Reflexive roots, whereas Hebrew $\sqrt{\text{ACTION}}$ combines with all classes of roots.
 c. Greek *afto*- uses counter-cyclic attachment, whereas Hebrew $\sqrt{\text{ACTION}}$ is satisfied through delayed saturation.

The first two differences can only be stated in the kind of vocabulary developed in the current framework. This enterprise—of which Spathas et al. (2015) is part—allows us to pinpoint similarities and differences between the languages by analyzing functional heads and their interaction with roots. If this approach is on the right track, work on argument structure will be in a better position to understand how syntactic structure feeds the semantics and how these combinations are reflected in the morphology.

The last difference, (57c), is mostly a matter of technical preference. The proposal for Greek assumes that nothing can be merged in the specifier of Voice_[-D] but that the internal argument may be moved there. I prefer to maintain a general “Merge over Move” principle of economy, which is inconsistent with such an analysis unless further assumptions about the numeration are made explicit. Similarly, I do not adopt late merger of adverbials such as *afto*. That said, the bottom line of the current analysis—the functional heads and the way in which roots constrain semantic interpretation—can be implemented in the minimally different *afto*-style system as well.

In Greek, like in Hebrew, the case can be made for a distinction between Self-Oriented and Other-Oriented roots. This approach to roots can be extended further. In her work on Italian verbs of motion, Folli (2001) describes different kinds of motion events which lead to verbs that are either unaccusative, unergative or ambiguous between the two. These events correspond to different root classes. Levinson (2014) likewise shows that verbs of creation in English license different kinds of syntactic constructions depending on their own semantics. For a summary of additional cases see Alexiadou et al. (2014).

Furthermore, it has been shown that even within an existing change-of-state alternation, the transitive verb may have a meaning that the intransitive does not (Levin & Rappaport Hovav 1995: 85):

- (58) a. He broke his promise/the contract/the world record.
 b. *His promise/The contract/The world record broke.
- (59) a. This book will open your mind.
 b. *Your mind will open from this book.

- (60) a. The waiter cleared the table.
 b. *The table cleared.

There is a clear sense in which the lexical semantics of different roots dictates the kind of derivations they may participate in. These observations all call for further research and formalization.

6 Alternatives for Hebrew

6.1 Distributed morphosemantics (Doron 2003)

Like the current system, the seminal analysis of Hebrew verbs in Doron (2003) employed a number of functional heads to derive the different templates. Doron (2003) was the first to identify basic non-templatic elements that combine compositionally in order to form Hebrew verbs. For example, a MIDDLE head μ was used to derive the “middle” template *niXYaZ*, where I make use of the head Voice_[-D] familiar from other languages.

The present system is influenced directly by Doron’s. The important conceptual difference is that my elements are syntactic whereas those in Doron (2003) can be characterized as morphosemantic: each one had a distinct semantic role. A Doron-style system takes the semantics as its starting point, attempting to reach the templates from syntactic-semantic primitives signified by the functional heads. Such a system runs into the basic problem of Semitic morphology: one cannot map the phonology directly onto the semantics. For example, there is no way in which a causative verb has a unique morphophonological exponent.

Reflexive verbs highlight a false prediction made by this system. Doron (2003: 60) derives reflexives in *hitXaYeZ* by assuming that a head MIDDLE assigns the Agent role for this root. This explains why *histager* ‘secluded himself’ is agentive, hence reflexive. However, if the only relevant elements are Voice_[-D] and the root, then a verb in the same root in *niXYaZ* (where I have Voice_[-D] and Doron 2003 has MIDDLE) is also predicted to be agentive. This expectation is incorrect: *nisgar* ‘closed’ is unaccusative. That analysis is almost a mirror image of the one presented here: while I let $\sqrt{\text{ACTION}}$ add agentivity to a structure with Voice_[-D], thereby deriving reflexives, the morphosemantic account invokes added agentivity for certain roots, bypassing the syntax in ways that lead to false predictions. While this problem can be overcome, the system as a whole has little to say about the unaccusative (for anticausatives) and unergative (for reflexives) characteristics of verbs in *hitXaYeZ*, since it is not based strictly in the syntax.

I should take a moment to emphasize the most important gains of the morphosemantic theory. Treating templates as emergent from heads that do separate syntactic and semantic work gave us a new way to analyze argument structure alternations across templates, based on a wealth of empirical data. The theory also made a compelling case for the root as an atomic element participating in the derivation, making a number of novel observations along the way. Where we have made progress is by flipping one of the assumptions on its head: that the primitives have strict syntactic content and flexible semantic content, rather than strict semantic content and unclear syntactic content.

6.2 Templates as morphemes

In juxtaposition to an “emergent” view of templates from functional heads, the traditional approach to Semitic templates has been to treat them as independent atomic elements, i.e. morphemes. Contemporary work in this vein spans highly divergent implementations but includes Arad (2003, 2005), who treated verbal templates as distinct spell-outs of Voice; Borer (2013), for whom different templates are different “functors”; Aronoff (1994, 2007), who identifies templates with conjugation classes; and Reinhart & Siloni (2005)

and Laks (2011, 2014), whose lexicalist account similarly grants morphemic status to verbal templates.

Syntactic and lexicalist accounts both need to stipulate that only a subset of roots (or stems) licenses reflexive derivations. What is at issue here is the status of the template. The general problem with morphemic approaches to templates is that a given template simply does not have a deterministic syntax or semantics, as noted in the Introduction and argued for by Doron (2003) and Kastner (2016). Arad (2005: 198) and Borer (2013: 564) actually speculate that a configurational approach (like in our theory) might be more viable than a feature-based or functor-based approach. As far as the treatment of reflexives is concerned, morphemic accounts can go no further than stipulating that *hitXaYeZ* is the template for reflexive verbs.

To repeat a point made earlier: stipulating that reflexives are formed using the morphophonological form *hitXaYeZ* does not explain why it is precisely this template that is involved, nor why this template also allows for anticausativization. Certain correlations would then be missed out on: that this template is both morphophonologically and semantically complex, or that reflexives and anticausatives appear to have a shared base. The system developed in this paper provided the answer to this question, based on functional heads required elsewhere in the grammar.

7 Conclusion

The main empirical issue addressed in this paper was the morphology of reflexive verbs in Hebrew. On the morphophonological side, these verbs have a specific form, though this form is shared with other kinds of verbs (anticausatives and reciprocals). On the morphosyntactic side, reflexive verbs show mixed behavior of unergative and unaccusative constructions. And on the morphosemantic side, they seem to only be available with a certain class of lexical roots. The resulting theoretical discussion addressed the question of how semantic roles are distributed in the syntax and how are they reflected in the morphology.

I have argued for a system in which neither theta-roles nor dedicated reflexivizers are necessary. Instead, a nonactive syntactic structure—that is, one without an external argument—can have agentive semantics if and only if it is coupled with an agentive modifier and an appropriate root. In other words, the correct interpretation of the verb is a result of functional heads combining with the idiosyncratic information contained in the root.

The analysis presented here is part of a general approach to non-concatenative morphology of the Semitic kind as exemplified by Hebrew. Generally, one cannot predict the meaning of a verb from its morphophonological form (its template), nor can one predict what template a verb will have based solely on its meaning. The solution to this mapping problem was implemented in a system that builds syntactic structure and then interprets said structure at PF and LF. For a consistent system to be set up, templates must be viewed as emergent from functional heads in the structure and not as morphemes, which is the traditional view. Once the structure is set up correctly, roots have the power to influence the interpretation at the semantics, but no earlier. How they do this is a matter of ongoing work, in Semitic and beyond.

Abbreviations

ACC = accusative, CAUS = “causative” template *heXYiZ*, DAT = dative, <e> = semantic type of entities, INTNS = “intensive” templates *XiYeZ* and *hitXaYeZ*, MID = “middle” template *niXYaZ*, NOM = nominative, PL = plural, <s> = semantic type of eventualities, SG = singular, SMPL = “simple” template *XaYaZ*, <t> = semantic type of truth values.

Acknowledgements

This paper is based on parts of Chapter 2 of my 2016 NYU dissertation. I am grateful to Edit Doron, Alec Marantz and Stephanie Harves for generously commenting on previous versions of this work, and to Michael Becker and Maria Gouskova for their input on the project in general. Thanks to Florian Schäfer, Giorgos Spathas and Despina Oikonomou for many more helpful comments than I could have hoped to incorporate into a single paper. The ideas presented here have benefited from conversations with Artemis Alexiadou, Dylan Bumford, Lucas Champollion, Neil Myler, Jim Wood and Vera Zu. Thanks also to the *Glossa* reviewers and to audiences at RUESHeL (HU Berlin), NYU, HUJI, MIT, UCSC and USC. All errors are on the surface; deep errors are my own.

Competing Interests

This study was supported by AL 554/8-1 (DFG Gottfried Wilhelm Leibniz Preis 2014 to Artemis Alexiadou). The author has no competing interests to declare.

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How to cite this article: Kastner, Itamar. 2017. Reflexive verbs in Hebrew: Deep unaccusativity meets lexical semantics. *Glossa: a journal of general linguistics* 2(1): 75. 1–33, DOI: <https://doi.org/10.5334/gjgl.299>

Submitted: 18 November 2016 **Accepted:** 15 May 2017 **Published:** 25 August 2017

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